

FIGURE 1

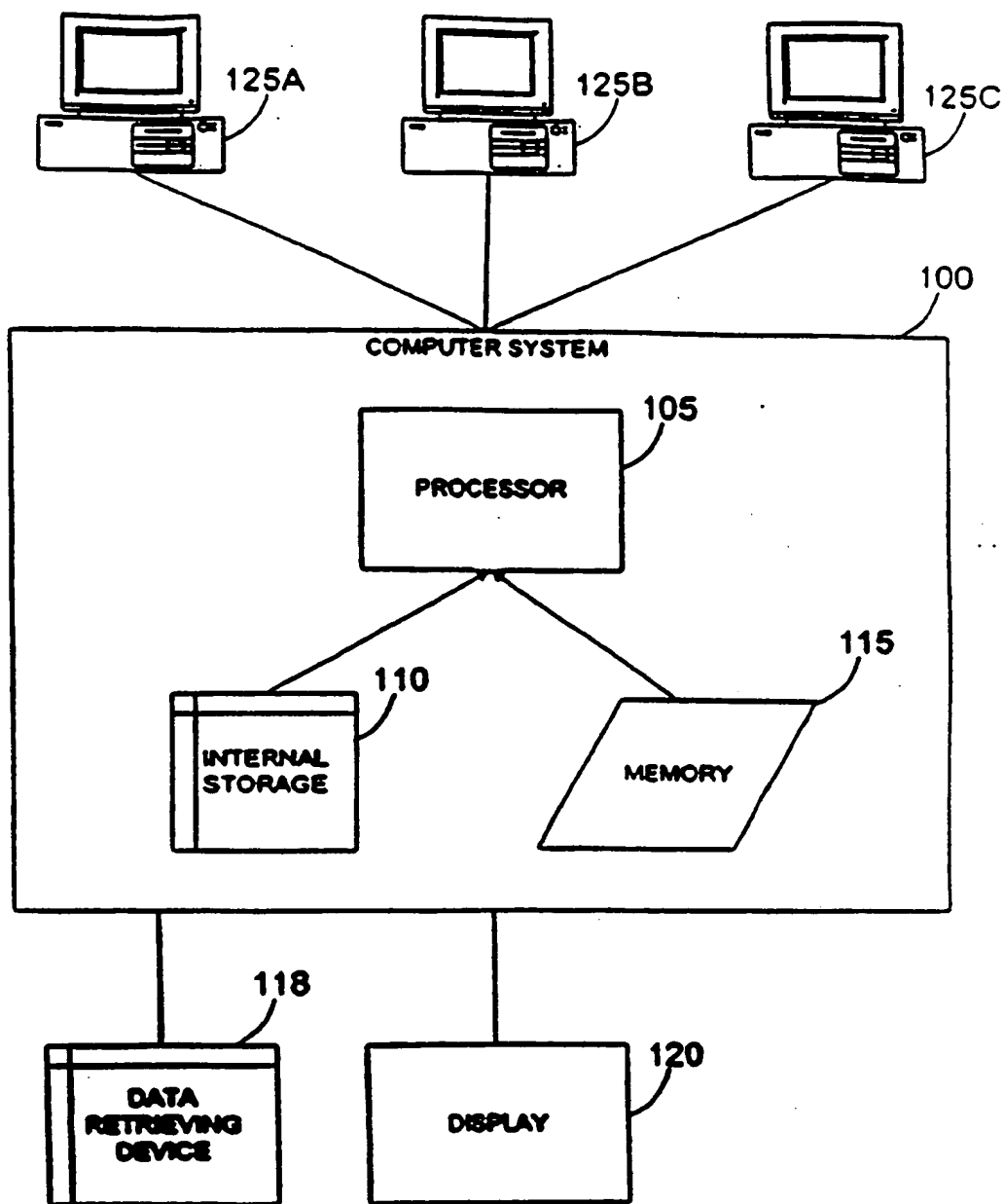


FIGURE 2

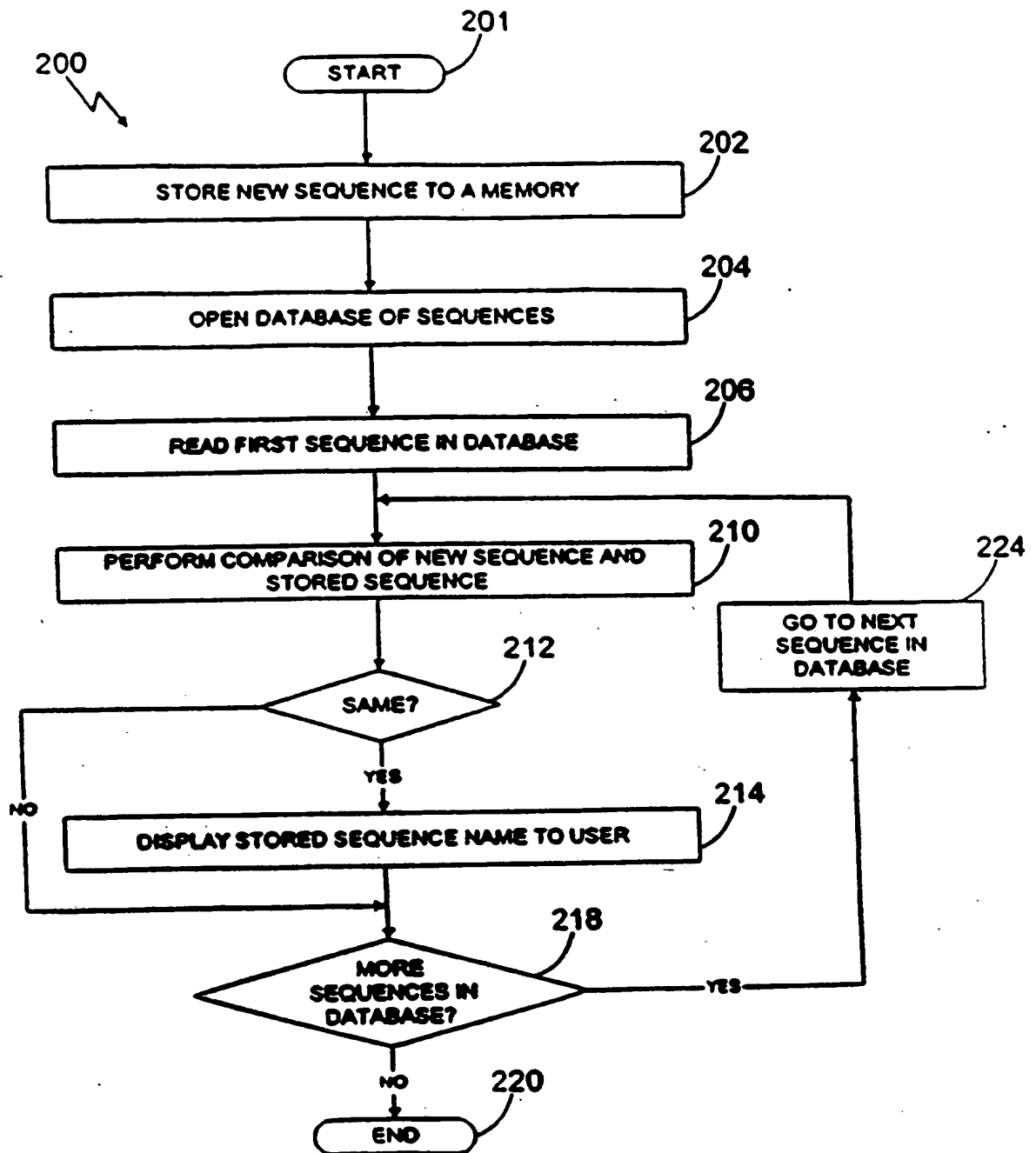


FIGURE 3

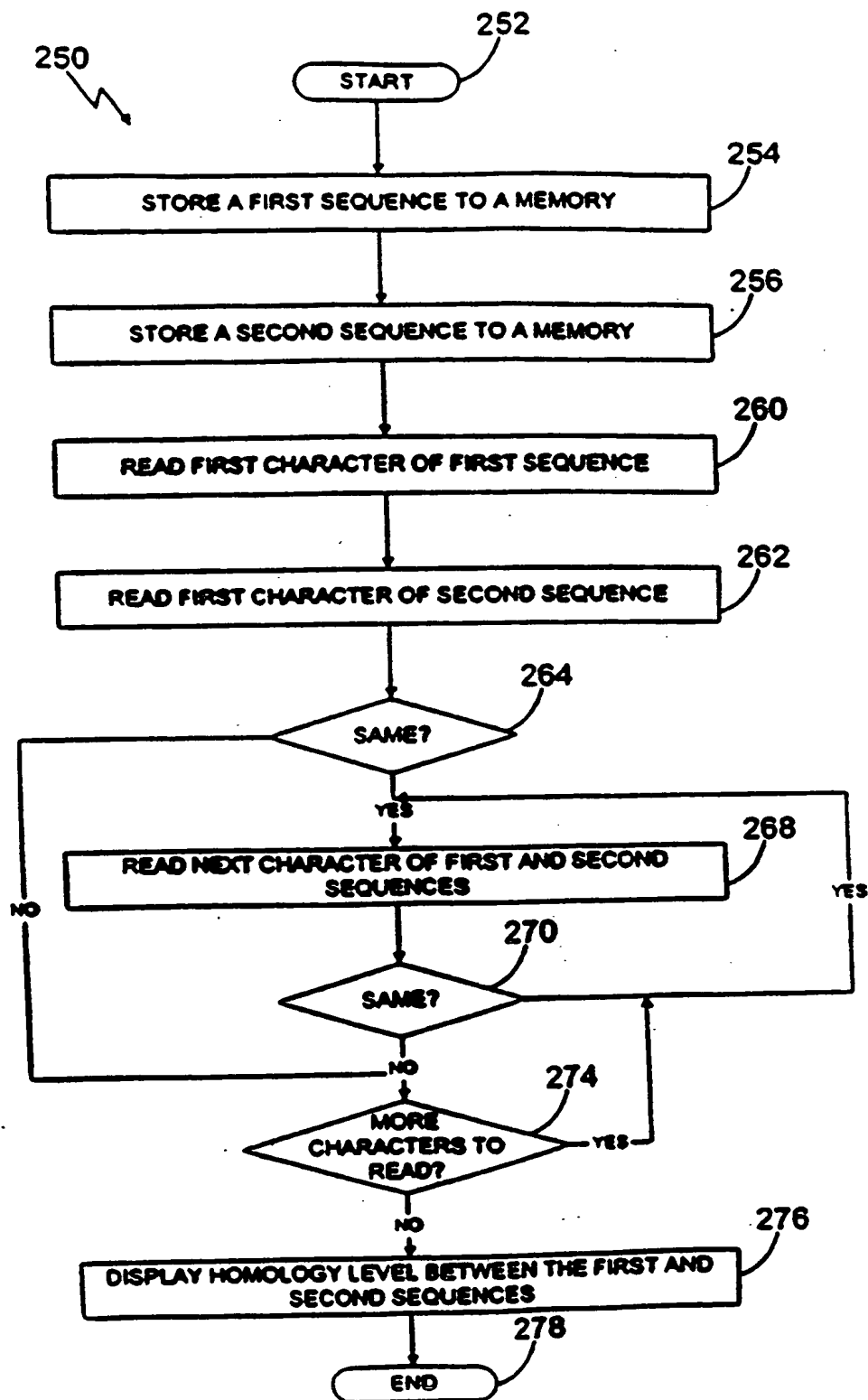


FIGURE 4

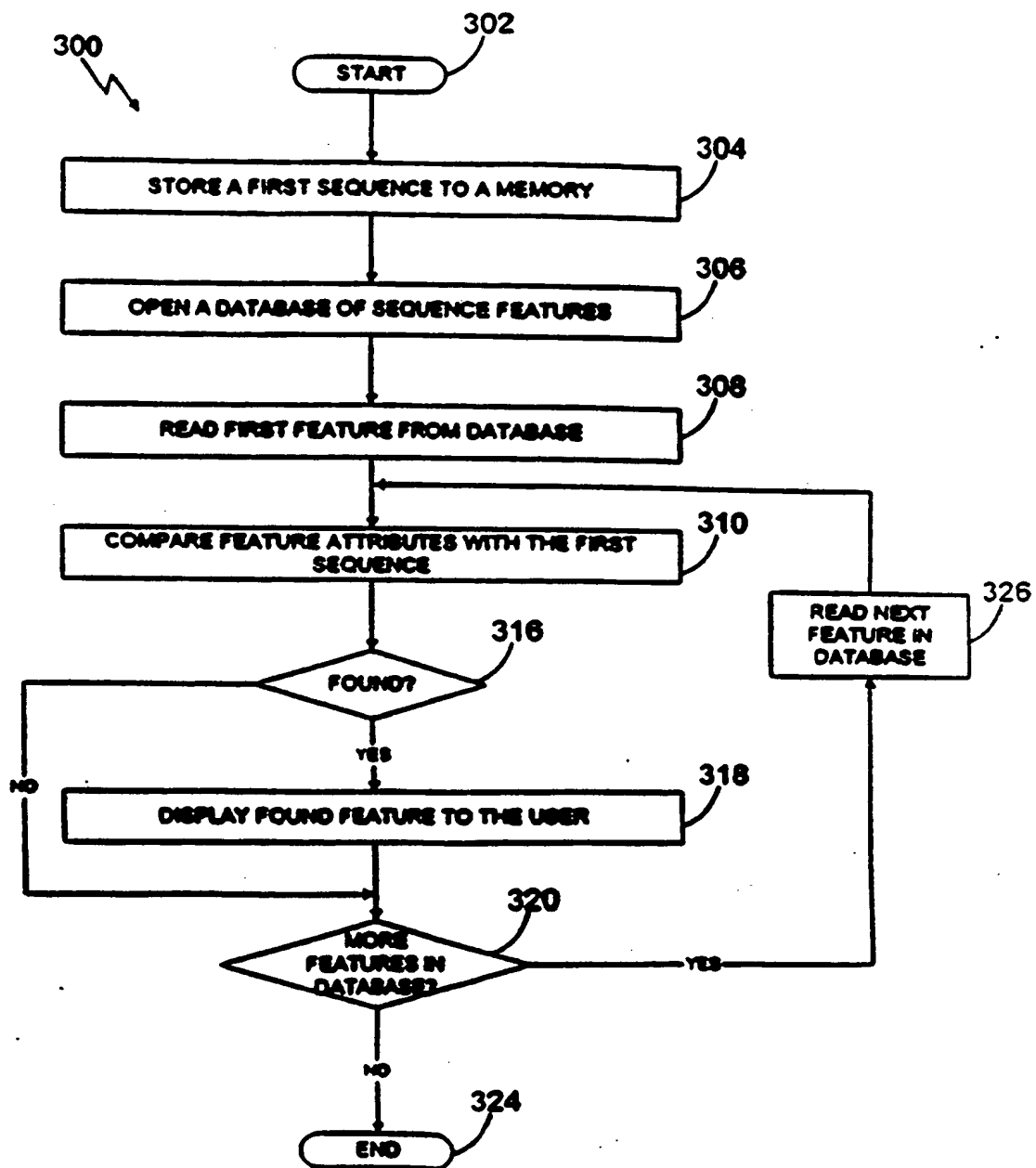


FIGURE 5A

SEQ ID NO: in provisional	Relative Substrate Specificity	Relative Substrate Specificity Value	Characterization Activity Temp	Characterization Activity pH	Enzyme	Characterization Description	Characterization Substrate
101,102			room temp	9	Pectinase	pga assay	Polygalacturonic acid
1, 2					Pectate lyase		
103, 104					Pectate lyase		
105, 106	Cotton	4.8	40	9	Pectate lyase	Application Bioscoursing	Cotton
107, 108	Cotton	1.5	40	9	Pectate lyase	Application Bioscoursing	Cotton
107, 108			room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
109, 110					Pectate lyase		
11, 12					Pectate lyase		
111, 112					Pectate lyase		
113, 114					Pectinase		
115, 116					Pectate lyase		
117, 118	Cotton	3	room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
119, 120			40	9	Pectate lyase	Application Bioscoursing	Cotton
121, 122	Cotton	7.8	room temp	9	Pectate lyase		
121, 122	Cotton	10.3	50	9	Pectate lyase	Application bioscoursing	Cotton
123, 124	Cotton	3.6	40	9	Pectate lyase	Application Bioscoursing	Cotton
125, 126	Cotton	2.5	40	9	Pectate lyase	Application Bioscoursing	Cotton
127, 128			room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
127, 128			room temp	11	Pectate lyase	pga assay	Polygalacturonic acid
129, 130	Cotton	1.8	40	9	Pectate lyase	Application Bioscoursing	Cotton
13, 14			room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
15, 16					Pectate lyase		
17, 18					Pectate lyase		
19, 20					Pectate lyase		
21, 22			room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
23, 24					Pectate lyase		
25, 26			room temp	10	Pectate lyase	pga assay	Polygalacturonic acid
25, 26			room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
27, 28					Pectate lyase		
29, 30					Pectinase		
3, 4					Pectinase		

FIGURE 5B

31, 32	4.3	40	9	Pectate lyase	Application Bioscoursing	Cotton
31, 32		room temp	8	Pectate lyase	pga assay	Polygalacturonic acid
33, 34		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
35, 36	1.6	40	9	Pectate lyase	Application Bioscoursing	Cotton
35, 36		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
37, 38	11.2	50	9	Pectate lyase	Application Bioscoursing	Cotton
39, 40		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
41, 42	2	40	9	Pectate lyase	Application Bioscoursing	Cotton
43, 44				Pectate lyase		
45, 46		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
47, 48		room temp	10	Pectate lyase	pga assay	Polygalacturonic acid
49, 50				Pectate lyase		
5, 6				Pectate lyase		
51, 52				Pectate lyase		
53, 54	13.4	40	9	Pectate lyase	Application Bioscoursing	Cotton
55, 56				Pectate lyase		
55, 56		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
57, 58		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
59, 60		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
61, 62	12.5	40	9	Pectate lyase	Application Bioscoursing	Cotton
61, 62		room temp	10	Pectate lyase	pga assay	Polygalacturonic acid
63, 64				Pectate lyase		
65, 66				Pectate lyase		
67, 68	9.8	40	9	Pectate lyase	Application Bioscoursing	Cotton
69, 70		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
7, 8		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
71, 72		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
73, 74	0.8	40	9	Pectate lyase	Application Bioscoursing	Cotton
73, 74		room temp	10	Pectate lyase	pga assay	Polygalacturonic acid
75, 76				Pectinase		
77, 78	16.2	40	9	Pectate lyase	Application Bioscoursing	Cotton
79, 80				Pectinase		
81, 82	1.6	40	9	Pectate lyase	Application Bioscoursing	Cotton
81, 82		room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
83, 84	3.2	40	9	Pectate lyase	Application Bioscoursing	Cotton

FIGURE 5C

85, 86	Cotton	0.1	40	9	Pectate lyase	Application Bioscoursing	Cotton
85, 86			room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
87, 88	Cotton	9.4	40	9	Pectate lyase	Application Bioscoursing	Cotton
89, 90					Pectinase		
9, 10			room temp	10	Pectate lyase	pga assay	Polygalacturonic acid
91, 92					Pectate lyase		
93, 94					Pectate lyase		
95, 96	Cotton	5.4	40	9	Pectate lyase	Application Bioscoursing	Cotton
95, 96			room temp	9	Pectate lyase	pga assay	Polygalacturonic acid
97, 98					Pectate lyase		
99, 100	Cotton	16	50	9	Pectate lyase	Application Bioscoursing	Cotton
99, 100	Cotton	12.2	40	9	Pectate lyase	Application Bioscoursing	Cotton

FIGURE 6

Pectate lyase GSSM™ upmutants												
Upmutant	Mutation											
	A118H	A182V	T190L	A197G	S208K	T219M	T223E	S255R	S263K	N275Y	Y309W	S312V
A	x			x	x	x				x	x	x
B	x		x		x	x				x	x	x
C	x	x			x		x			x	x	
D	x	x	x		x			x	x	x	x	
E	x				x				x	x	x	
F	x	x			x		x	x		x	x	
G	x		x		x		x	x	x	x	x	x
H	x	x	x	x	x		x			x	x	x
I	x			x	x		x		x		x	
J	x			x	x				x		x	x
K	x		x	x	x	x	x		x		x	x
L	x	x	x		x		x		x	x	x	
M	x	x		x	x		x		x	x	x	
N	x		x	x	x				x	x	x	
O	x			x	x				x		x	x
P	x	x		x	x	x			x		x	x
Q	x		x		x			x		x	x	
R	x		x	x	x				x		x	x
S	x		x	x		x	x	x	x	x	x	x

FIGURE 7

Upmutant	Melting temperature (°C)	Specific Activity (SA)				
		at 30°C	SA at 40°C	SA at 50°C	SA at 60°C	SA at 70°C
AA	60.6	370.3	582.1	848.2	ND	ND
BB	58.3	366.8	542.4	648.6	ND	ND
CC	57	331.1	439.7	713.6	ND	ND
DD	58	468.6	595.8	714.6	ND	ND
EE	60	102.2	202.5	378.1	ND	ND
FF	58.5	585.5	744.5	955.8	ND	ND
GG	57.2	323.8	590.4	909.3	ND	ND
HH	58.7	267.6	425.5	706.3	ND	ND
II	57.8	357.1	527.3	875.1	ND	ND
JJ	57.5	372.2	537.6	834.9	ND	ND
KK	58.9	444.1	678.9	859.4	ND	ND
LL	58.4	375.2	557.6	1007.1	ND	ND
A	71	ND	ND	311.1	483.3	777.7
B	70.4	ND	ND	317.0	432.4	628.0
C	72.5	ND	ND	377.6	468.6	849.1
D	73.25	ND	ND	323.8	352.2	926.4
E	71	ND	ND	340.4	557.6	641.7
F	71.75	ND	ND	389.3	550.8	438.3
G	73	ND	ND	297.4	545.9	790.4
H	72.25	ND	ND	356.1	480.3	980.2
I	70.4	ND	ND	363.9	701.4	666.2
J	72.8	ND	ND	241.6	622.2	694.6
K	71.5	ND	ND	298.4	701.4	700.4
L	73	ND	ND	245.5	947.0	1003.7
M	73	ND	ND	304.2	547.8	309.1
N	73	ND	ND	685.8	1010.5	1284.5
O	71.3	ND	ND	268.0	517.5	330.7
P	72	ND	ND	398.2	542.9	689.7
Q	70.8	ND	ND	354.1	382.5	526.3
R	71.9	ND	ND	361.0	408.9	722.0
S	70.9	ND	ND	753.3	1186.6	579.1

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